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APPARATUS AND A METHOD OF MANUFACTURING PACKAGING BAGS

The present invention relates to the field of manufacturing packaging bags.

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More precisely, the present invention relates to apparatuses for manufacturing packaging bags from a continuously travelling film fitted with at least one tape having an opening/closing function. More precisely still, the present invention relates preferably to apparatuses for manufacturing bags in which the tape having an opening/closing function extends transversely to the travel direction of the film.

Nevertheless, as described in greater detail below, the present invention is not limited to this specific application. The invention can also be applied to apparatuses in which said tapes having an opening/closing function are disposed parallel to the travel direction of the film or obliquely relative to said direction.

Numerous apparatuses of this kind are known.

The tape having an opening/closing function can take numerous forms.

By way of example, the tape having an opening/closing function can be formed by complementary closure strips, e.g. male/female strips, or strips with complementary hooks, placed on opposite faces of the film.

The tape having an opening/closing function can also be formed by a tear/cut tape or strip, an adhesive tape, which can optionally be a peel-off tape, or indeed a metal tape for closing by being folded, etc. . . .

Such apparatuses for manufacturing packaging bags are known in which travel takes place horizontally or vertically.

In particular, so-called form, fill, and seal (FFS) machines are known which automatically form the bags, fill them, and then close them.

In particular, FFS machines are known that comprise:
· means for delivering the film in the plane state;

• means for shaping the film into a tubular state on a forming neck;

• means for closing the resulting tube longitudinally, generally by heat-sealing;

5 • a funnel which opens out into the tube formed in this way for conveying the product that is to be packaged; and

• means for fixing the tubular film in a transverse direction, generally again by heat-sealing.

10 Still more precisely, said means are generally designed to provide almost simultaneously a line of heat-sealing that constitutes, for example, the bottom of a bag that is upstream in the travel direction, a second line of heat-sealing closing the mouth of a bag
15 downstream therefrom, and a line of cut sectioning the tubular film so as to separate the finished downstream bag from the upstream bag that is in preparation.

In particular, machines now exist that have a station designed for fixing the tape having an
20 opening/closing function onto the film upstream from the forming neck, and to do so transversely relative to the travel direction of the film.

Nevertheless, in a variant, the closure tape can be placed longitudinally, i.e. parallel to the travel
25 direction of the film, or indeed obliquely relative to said direction.

Those known machines have already given good service.

Nevertheless, they do not always give complete
30 satisfaction in the sense that it is sometimes difficult to control accurately proper positioning of the tape having an opening/closing function.

This problem is particularly severe with machines that operate continuously with the film travelling at
35 very high speed.

An object of the present invention is thus to improve conventional apparatuses for manufacturing

packaging bags by enabling the positioning of the tape having an opening/closing function to be detected reliably.

5 In the context of the present invention, this object is achieved by apparatus for forming bags and including at least one sensor suitable for detecting the presence of the tape having an opening/closing function when it is in a predetermined position relative to means for treating the film cyclically in order to form bags, and
10 in particular relative to means provided on the apparatus for closing the bag-constituting film transversely.

According to an advantageous additional characteristic of the present invention, the sensor is constituted by a mechanical feeler.

15 The present invention also provides a method of making bags.

Other characteristics, objects, and advantages of the present invention will appear on reading the following detailed description and from the accompanying
20 drawings which are given as non-limiting examples, and in which:

• Figure 1 is a diagrammatic view of apparatus for forming packaging bags in accordance with the present invention;

25 • Figures 2 and 3 are views on a larger scale of a sensor in accordance with the present invention, respectively when detecting proper positioning of a tape and when detecting wrong positioning thereof;

• Figure 4 is a fragmentary side view of the
30 apparatus showing the location of the sensor; and

• Figures 5, 6, 7, and 8 are views similar to Figures 2 and 3 for a dual sensor and respectively on the assumption that positioning of the tape in question is detected as being correct, in Figure 5, and incorrect in
35 Figures 6, 7, and 8.

The description below relates essentially to apparatus in which the closing/opening tape is placed

transversely to the travel direction of the film.
Nevertheless, the invention is not limited to this
disposition. The invention also applies to apparatuses
in which the closing/opening tape is placed parallel to
the travel direction of the film, or obliquely relative
thereto.

Figure 1 shows apparatus for forming packaging bags
to which the invention applies particularly, but not
exclusively. Specifically this is an FFS type machine
with the film travelling vertically.

Figure 1 shows a roll 10 from which a plane film 12
is unrolled.

The film 12 is guided by various wheels or
equivalent means which are not described in detail below
insofar as they can be embodied in a wide variety of
ways.

In the context of the invention and preferably, the
apparatus has a station 14 downstream from the roll 10
for the purpose of placing an opening/closing tape on the
film 12 transversely to the travel direction of the film.

The film 12 then reaches a forming neck 16. This is
shaped in such a manner that on leaving the forming neck
16, the film 16 is in a tubular state. A filling funnel
18 is disposed above the forming neck 16 and opens out
into the tube that it forms. In conventional manner, the
filling funnel 18 is used to insert the product which is
to be packaged into the bag blanks that are formed by
said tubular film.

Means shown diagrammatically in Figure 1 under
reference 20 are designed to close the tubular film
longitudinally, e.g. by heat-sealing.

Downstream from this station 20, there is an
assembly 30 which is designed to perform the following
operations:

• using means 32 to make a transverse line of heat-
sealing on an upstream bag blank, to correspond to the
bottom of the upstream bag;

· using means 34 to make a transverse line of heat-sealing to finish off a downstream bag, the line of heat-sealing being provided at the mouth thereof;

5 · using sectioning means 36 interposed between the above-specified means 32 and 34 to section the film so as to separate the completed downstream bag from the upstream bag blank; and

· optionally using means 38 for finishing off the fixing of the tape having an opening/closing function on
10 the wall of the film.

Where appropriate, the tape having an opening/closing function can be fixed in the station 14 to only half of the width of the film, with the tape being fixed to the other half of the width of the film
15 downstream from the forming neck 16 by the above-mentioned means 38.

The machine shown in Figure 1 is a vertical travel machine.

The present invention applies equally well to
20 horizontal travel machines.

Furthermore, the present invention can also be applied to apparatuses for forming bags by using a film 12 that is prefitted on the reel 10 with transversely-extending tape having an opening/closing function.

25 Similarly, the invention applies to apparatuses for forming bags in which the tape having the opening/closing function is fitted to the film 12 at a location other than that shown in Figure 1, for example at the forming neck 16 or downstream therefrom.

30 As mentioned above, the present invention applies to any type of tape having an opening/closing function for bags, in particular it applies to tapes comprising complementary closure strips such as male/female strips, strips having complementary hooks, tear/cut tapes,
35 adhesive tapes, which can optionally be peel-off tapes, metal strips for closing by being folded, etc. . . .

The tape having the opening/closing function is given overall reference 60.

Similarly, the present invention applies to any type of film 12, for example plastics films, single layer or
5 composite plastics films, metallized films, etc.

As mentioned above, in the context of the present invention, at least one sensor is provided that is suitable for detecting the presence of the tape in an expected predetermined position relative to means for
10 treating the film cyclically.

The sensor 100 is preferably constituted by a mechanical feeler comprising a pusher 102 that is urged towards the film 12, which film is sandwiched between the feeler or pusher 102 and an anvil-forming abutment 110.
15 The pusher 102 is associated with an electrical contactor 104 that is responsive to the position of the pusher 102, i.e. is opened or closed depending on whether the opening/closing tape 60 is or is not present, and does or does not form an extra layer of thickness between the
20 abutment 110 and the pusher 102.

Preferably, in the context of the present invention, the sensor 100 is placed downstream from the jaws 100 that perform transverse heat-sealing on the film.

Still more precisely, the sensor 100 and the anvil 110 are preferably carried by the equipment that supports
25 the jaws 30 so that the anvil 110 and the sensor 100 are cyclically moved away from and moved towards to the film 12 synchronously with the heat-sealing jaws 30 so as to avoid disturbing the travel of the film 12.

Still more precisely, as shown diagrammatically in Figure 4, the sensor 100 is preferably located level with the longitudinal edge of the bag that is remote from the edge via which the tape having an opening/closing
30 function 60 is fed.

35 In Figure 4, an arrow referenced A represents the feeding of the tape 60.

The person skilled in the art will understand that the sensor 100 of the present invention makes it possible to detect simultaneously:

5 · the presence of the tape 60 having an opening/closing function;

 · proper feeding in the transverse direction of the tape 60, i.e. it can verify that the film is covered by the tape 60 (otherwise if the tape 60 does not cover the entire mouth of the bag, a subsequent closure defect can
10 be expected, or even a subsequent leak); and

 · that the tape 60 is properly positioned in the longitudinal direction relative to the travel direction of the film (wrong positioning in this direction would lead to the tape having an opening/closing function being
15 wrongly positioned relative to the mouth of the bag).

 Thus, in Figure 2, there can be seen the case of the tape 60 when it is properly positioned relative to the heat-sealing jaws 30. In contrast, Figure 3 shows a case when the tape 60 is detected as being in an incorrect
20 position (in this case, the tape 60 is too far forward relative to the travel direction of the film).

 When a problem is detected in this way and indicated by the sensor 100, it is possible to take action to reposition the film correctly. The present invention
25 thus makes it possible to eliminate drift due in particular to the intrinsic elasticity of the film 12, or indeed to deformation thereof because of its quality, or indeed depending on the type of product being packaged or the way in which the product is poured into the bags via
30 the funnel 18.

 Where appropriate, as shown in Figures 5 to 8, it is possible in the context of the present invention to use a dual feeler 100a, 100b where the two feelers are juxtaposed in the film travel direction. As will be
35 understood in particular on examining Figures 6 and 7, such a dual feeler makes it possible to improve the

detection of positioning since it makes it possible to detect a simple offset from the expected position.

According to an advantageous additional characteristic of the invention, two sensors 100 can be provided respectively at the two opposite longitudinal edges of the film 12 so as to detect a fault in the positioning of the strip 60, whereby the strip slopes relative to a direction that extends accurately at right angles across the travel direction of the film.

Furthermore, as mentioned above, the present invention applies equally well to apparatuses in which the opening/closing strip is placed not transversely but longitudinally, i.e. parallel to the travel direction of the film, or indeed obliquely relative to said direction (in which case the positions of the sensors need to be adapted accordingly). In the oblique case, it is possible to provide at least two sensors respectively close to each of the edges of the bag on a generator line that slopes relative to the travel direction of the film and that corresponds to the expected oblique position of the tape.

Naturally, the present invention is not limited to the particular embodiments described above, but extends to any variant within the spirit of the invention.